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Socio-Economic Impact Assessment of Electricity Tariff Adjustments on Households and Small/Medium Enterprises in South-South, Nigeria

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ABSTRACT: *Critical in the Nigerian Socio-economic structure are households, which supply labour to every other economic units and small/medium-sized enterprises (SMEs), which are considered as the backbone of Nigeria's economy and play a pivotal role in, employment generation, poverty reduction and economic development. This study investigates the economic impact of electricity tariff increases on households and SMEs in Nigeria, with a focus on the South-South region. Using descriptive, correlation, and regression analyses, the research examines consumer perceptions of electricity supply stability, affordability and billing practices, as well as the operational and financial effects of tariff adjustments on households and SMEs. The findings reveal that while households acknowledge some improvements in supply stability and billing transparency, a majority perceive electricity tariffs as excessive, resulting in significant increases in living costs and financial strain. Affordability challenges were evident, with nearly half of households reporting difficulty in meeting tariff obligations. SMEs reported substantial increases in operating costs and reduced profitability due to tariff hikes because of their dependence on reliable electricity for production and service delivery,. Inferential analyses confirm these observations: electricity tariff increases are positively and significantly associated with household expenses ($r = 0.325$, $p < 0.01$; $R^2 = 0.106$) and SME operating costs ($r = 0.421$, $p < 0.01$; $R^2 = 0.177$). The findings highlight the disproportionate impact of electricity pricing on business operations relative to household consumption. Overall, the study underscores the need for tariff reforms that balance financial sustainability with affordability, to prevent further erosion of household welfare and SME viability in Nigeria.*

Keyword: *Electricity tariff, household expenditure, small/medium enterprises, energy affordability, operating costs, labour, employment*

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I. INTRODUCTION

The strategic importance of small and medium enterprises (SMEs) and households in the Nigerian Socio-economic structure cannot be overemphasized. While households supply labour to every other economic unit, SMEs are considered as the backbone of Nigeria's economy and play a pivotal role in, employment generation, poverty reduction, and economic development. They account for over 90% of all businesses in the country and contribute approximately 48% of the national Gross Domestic Product (GDP), while also providing about 84% of total employment (National Bureau of Statistics, 2024). However, despite their importance, these economic units face persistence structural and socio-economic challenges. Prominent among these are insecurity, inadequate infrastructure, regulatory constraints, unstable macroeconomic environment, and poor access to energy supply (World Bank, 2020).

Electricity access and affordability remain fundamental challenges in Nigeria, with significant implications for both household welfare and the performance of small/medium enterprises (SMEs). Inadequate power supply has compelled many households and businesses to rely on costly alternative sources, thereby increasing the cost of living and operating expenses as well as exacerbating economic vulnerabilities (Nkalo and Agwu, 2019; Pelz et al., 2023). Research indicates that households and SMEs demonstrate diverse preferences and constraints in their willingness to pay for electricity connections and reliable supply, highlighting the complexity of energy demand in Nigeria's context (Janghorban et al., 2024). Despite efforts to improve electricity infrastructure, frequent outages and tariff adjustments continue to strain household budgets and business profitability, particularly in regions where grid reliability is low (Momoh, 2005; Akpan, 2013; Nigerian Energy Report, 2019; Akhator *et al*., 2019; Ike, 2021; Onah *et al*., 2021; Herbart, 2022; International Hydropower Association, 2022). It has been reported that businesses that struggle to manage elevated production expenses due to insufficient power supply often, move from Nigerian cities to other countries like

Ghana, where a more reliable power supply is guaranteed (Ghosh and Kathuria, 2020; Onah *et al*., 2021; International Renewable Energy Agency, 2023). Consumer attitudes toward electricity billing and payment systems significantly influence compliance and service satisfaction. Studies suggest that willingness to pay is not only a function of price but also of expected service quality, with many consumers reluctant to accept higher costs without commensurate improvements in reliability (Olanrele, 2024). Moreover, SMEs are forced to accommodate unnecessary costs due to irregular supply, as they often incur additional expenditure on backup generation to sustain operations (Yelwa and Awe, 2018; Akomolafe, 2024).

The Nigerian economic progress fundamentally relies on the sustained availability and cost-effectiveness of electricity. The correlation between energy consumption and economic growth is shaped by variables like family income, power tariffs and the accessibility of energy supplies. A balance among reasonable rates, sustainable income production and effective energy use is therefore, essential for promoting economic growth and development (Udah, 2010; Webster, 1991; REAN, 2021; IRENA, 2023; World Bank, 2023). Adenikinju (2020) lamented that poor electricity supply remains one of the most critical constraints, compelling many SMEs to rely heavily on self-generated power, which substantially increases operating costs and undermines profitability. Eze and Okonkwo (2024) conducted a study to evaluate how recent electricity tariff increases have affected household expenditure patterns and welfare in the Niger Delta. The results indicate a significant negative impact on disposable income and consumption among low- and middle-income households. The study concluded that tariff increments exacerbate household vulnerability to poverty. DISCOs serving high-density commercial regions often pass the costs associated with load variation directly onto consumers. In their study, Onyema *et al*. (2021) shows that Ikeja Electric's frequent demand spikes lead to higher costs during peak hours, affecting low-income households who are unable to adjust their consumption. Similarly, Oghenekaro and Nwachukwu (2024) assessed how electricity tariff variations influence operational costs and business sustainability of SMEs in Nigeria, with a focus on Port Harcourt Electricity Distribution Company (PHED). Tariff instability was shown to reduce productivity, discourage expansion, and increase reliance on diesel generators, thereby inflating operating costs.

Given these dynamics, this study aims to evaluate consumers' attitudes and responses toward electricity billing payments and to examine the economic impact of tariff plans and charges implemented by the Port Harcourt Electricity Distribution Company (PHEDC) and the Benin Electricity Distribution Company (BEDC) on households and SMEs in the South-South region of Nigeria. By integrating consumer perspectives with economic impact assessment, the research contributes to understanding how tariff structures influence energy affordability, consumption behavior, and economic resilience in Nigerian communities.

II. MATERIAL AND METHODS

The paper investigated the influence of electricity tariff on households and SMEs in South-South, Nigeria. The study employed the survey method, specifically a descriptive survey which involves the use of questionnaires for data collection. The survey was distributed randomly among electricity consumers, employees of power companies, retired electricity workers, and personnel from relevant economic sectors which included households and SMEs. For the paper, Cochran formula for determining sample size for unknown population (equation 1) was considered suitable (Cochran, 1977), which gave rise to a sample size of 384 respondents. However, a total of 302 participants in the region, who responded and returned the questionnaire, were used for the study analysis.

$$\boldsymbol{n_0 = \frac{t^2 \times p \times (1-p)}{d^2}} \qquad (1)$$

where: n_0 constitutes the bare minimum for the projected sample size, t is t-value; for the chosen p, 0.5, t = 1.96, p is the fraction of the population that is estimated (50% was used) and d is the margin of error; commonly suggested as 0.05 (Cochran, 1977, Ndu, 2018).

The questionnaire was distributed to a selection of households and SMEs consumers in South-South, Nigeria. The paper adopted stakeholders' theory tools to aggregate the perspectives of electric energy consumers. Stakeholder theory serves as a theoretical foundation which enables the researcher to identify individuals or groups who may influence or be influenced by a proposed action. This process involves categorizing these stakeholders based on their potential impact on the action and the effects that the action may have on them. The participants in this context included both individuals and organizations. Stakeholders were classified into various groups, including consumers, investors, regulators, and additional entities. Respondents were contacted by mail, with telephone interviews potentially undertaken as a follow-up and supplement to the mailing technique. Owing to time constraints and geographical limits, many respondents to whom the questionnaire was personally distributed were residents and employees in Rivers and Edo States of Nigeria. Stakeholders were identified, and study questionnaires were sent individually to them.

The questionnaire was used as a data collection instrument that was utilized. A total of twenty-three (23) questions were included in the questionnaire. The questions were grouped into five (5) distinct parts for

households and four (4) parts for SMEs. Following the completion of the collecting process, the questionnaire was revised to guarantee that sufficient replies have been rendered and that the responses are consistent with one another. As a result of this, the major data for this study was collected via the use of questionnaires that were given by the researchers in both hard copies and soft copies through the administration of Google forms. In addition, the questionnaire included open-ended questions, which gave respondents the opportunity to contribute explanations on the topic matter. The study also utilized an ex-post-facto design, which involved the collection of secondary data through visits to the Benin electricity distribution company (BEDC) and the Port Harcourt Electricity Distribution Company (PHDC) during energy audit sessions.

2.1 Model Specification

The regression model is grounded in the endogenous growth theory (Pack, 1994; Onyimadu, 2015). The variables were judiciously chosen for their relevance. The literature examined also revealed several factors influencing economic growth. The overarching endogenous production function is as follows:

$$\boldsymbol{Y = Af(K, L)} \quad (2)$$

where: Y is output (industrial output or gross domestic product), A is total factor productivity or efficiency parameter, K is capital stock and L is labour.

For the sake of clarity, it is posited that each industry or economy will employ an equivalent level of capital and labor. In the context of this study, it is posited that the influence of electricity tariffs on output, whether in terms of industrial output or gross domestic product-functions through total factor productivity (A). The paper explores the influence of electricity tariffs on economic growth in Nigeria through precise model specification. It is posited that total factor productivity (A) is contingent upon electricity tariff (ET) and technology (TECH). Thus:

$$\boldsymbol{A = f(ET, TECH)} \quad (3)$$

Combining equations (1) and (2) and substituting for A, we have:

$$\boldsymbol{Y = f(ET, TECH, K, L)} \quad (4)$$

By dividing equation (4) by "L" to delineate the economic development equation, considering that per capita gross domestic product (PCGDP) serves as a proxy for assessing economic development and that "L" is a component of PCGDP, we arrive at:

$$\boldsymbol{{}^{Y}/_{L} = PCGDP = f(ET, TECH, K, L)} \quad (5)$$

This implies that:

$$\boldsymbol{Y = PCGDP = f(ET, TECH, K)} \quad (6)$$

where: ET= Electricity tariff in kilowatt/N, TECH = Technology (time variable, one year is one data point), L = Labour force (labour force in the economy), K = Capital stock (Measured by gross fixed capital formation) and PCGDP = Per capita gross domestic product (a proxy for measuring economic development).

While there are various indicators of economic growth, such as life expectancy at birth, literacy rates, infant mortality, water supply, housing conditions and the increasing flow of goods and services, these are but a few examples worth noting. This study employs per capita gross domestic product (PCGDP) as it represents the sole proxy for which extensive trend or time series data is readily available in Nigeria.

It is important to recognize that the amount of electricity consumed does not accurately represent the actual electricity provided. The measure of electricity tariff (ET) is fundamentally determined by the quantity of electricity consumed, which reflects the potential supply from PHEDC and BEDC.

To express the regression functions in an estimation format, the functions are reformulated into a logarithmic form to incorporate the stochastic error term.

$$\boldsymbol{lnPCGDP = b_0 + b_1 lnES + b_2 lnTECH + b_3 lnK + UI;\ b_0\ to\ b_3 > 0} \quad (7)$$

where ln = log of the variables; UI = Stochastic error term, b_0 to b_3 represent the various parameters to be estimated measuring the impact of the explanatory variables.

Equation (7) represents the appropriate model for estimation. Udah (2010) incorrectly specified and estimated a model by including labor (L), which is a component of PCGDP, as one of the independent variables, contrary to the appropriate methodological approach.

III. CASE STUDY: ANALYSIS OF THE RESPONSES OF HOUSEHOLD AND SME CONSUMERS IN SOUTH-SOUTH, NIGERIA

The analysis in Tables 1 and 2 provided comprehensive empirical evidence on the effects of increased electricity tariffs on households and small/medium-sized enterprises (SMEs) in Nigeria. Using descriptive statistics, correlation, and regression analyses, the study reveals consistent patterns that underscore the socio-economic implications of electricity tariff increases across both household and business sectors.

The descriptive analysis of Table 1 for households consumers, indicate a moderately positive perception of electricity supply stability, as 69.5% of respondents agreed that electricity supply in their

residential areas is relatively stable. This perception is reflected in the mean score of 2.927. However, the sizeable minority of respondents (30.5%) who disagreed suggests that electricity supply reliability remains uneven across locations, highlighting persistent infrastructural and distribution challenges. Despite perceived improvements in supply stability, respondents overwhelmingly rejected the justification for increased electricity tariffs.

Table 1: Descriptive analysis of the effect of electricity tariff on households

Questionnaire Items	Responses	Frequency	(%)	Mean	Standard Deviation
1. Electricity supply is stable in your area.	Strongly Disagree	7	2.3		
	Disagree	85	28.2		
	Agree	133	44.0		
	Strongly Agree	77	25.5		
	Total	302	100.00	2.927	0.791
2. Increase in tariff for electricity supply is reasonable.	Strongly Disagree	139	46.0		
	disagree	84	27.8		
	Agree	68	22.5		
	Strongly Agree	11	3.7		
	Total	302	100.00	1.838	0.898
3. I can easily afford my electricity tariffs.	Strongly Disagree	51	16.9		
	disagree	97	32.1		
	Agree	86	28.5		
	Strongly Agree	68	22.5		
	Total	302	100.00	2.566	1.018
4. There is always transparency in billing via meter readings from DISCO.	Strongly Disagree	20	6.6		
	disagree	79	26.2		
	Agree	126	41.7		
	Strongly Agree	77	25.5		
	Total	302	100.00	2.861	0.874
5. Electricity tariff has increased my cost of living.	Strongly Disagree	2	0.7		
	Disagree	39	12.9		
	Agree	142	47.0		
	Strongly Agree	119	39.4		
	Total	302	100.00	3.252	0.699

About 74% of respondents disagreed that the tariff increment was reasonable, a position reinforced by the low mean score of 1.838. This suggests a disconnection between tariff adjustments and consumers' perceived value of electricity services. Affordability emerged as a critical concern among households. While 51% of respondents indicated that they could comfortably manage electricity tariff payments, nearly half (49%) reported difficulty in meeting these obligations. This near-equal split signals a fragile affordability threshold, particularly for low- and middle-income households. Furthermore, although most respondents (67.2%) acknowledged transparency in the distribution Companies' billing through meter readings, a substantial proportion (32.8%) expressed dissatisfaction, indicating lingering trust and accountability concerns within electricity billing practices. Most notably, the impact of electricity tariff increases on household welfare was pronounced. A significant 86.4% of respondents agreed that tariff increases have raised their cost of living, as reflected by the high mean score of 3.252.

Similarly, the descriptive analysis for SMEs, given in Table 2, reveal an even stronger dependency on electricity supply. An overwhelming 84% of respondents reported that their enterprises rely heavily on consistent electricity to operate efficiently, as supported by the mean score of 3.176. This underscores the critical role of electricity as a production input for SMEs in Nigeria. In addition, approximately 74% of respondents agreed that electricity tariffs impose a significant financial burden on their businesses, while over 83% reported that increases in electricity tariffs have directly escalated their operating costs. The effect of tariff increases on SME profitability is particularly concerning. About 80% of respondents indicated that increased electricity tariffs have negatively affected their profitability, with a mean score of 3.156.

Table 2: Impact of electricity tariff on SMEs

Questionnaire Items	Responses	Frequency	(%)	Mean	Standard Deviation
1. My business requires steady electricity supply.	Strongly Disagree	9	3.0		
	Disagree	39	12.9		
	Agree	144	47.7		
	Strongly Agree	110	36.4		
	Total	302	100.00	3.176	0.764
2. Cost of electricity tariff is high for my business.	Strongly Disagree	0	0.0		
	Disagree	80	26.5		
	Agree	82	27.2		
	Strongly Agree	140	46.3		
	Total	302	100.00	2.883	1.087
3. My operating cost is high as a result of increase in electricity tariff.	Strongly Disagree	15	5.0		
	Disagree	37	12.3		
	Agree	152	50.3		
	Strongly Agree	98	32.5		
	Total	302	100.00	3.103	0.798
4. Electricity tariff affect my level of profitability.	Strongly Disagree	11	3.6		
	Disagree	49	16.2		
	Agree	124	41.1		
	Strongly Agree	118	39.1		
	Total	302	100.00	3.156	0.823

The inferential analysis further reinforces the descriptive findings. The Pearson Product Moment Correlation results in Table 3 reveal a statistically significant positive relationship ($r = 0.325$, $p < 0.01$) between electricity tariff increases and household expenses. This indicates that as electricity tariffs rise, household expenditures also increase.

Table 3: Effect of the increase in electricity tariff on households in Nigeria

Correlations			
		Electricity Tariff	Household
Electricity Tariff	Pearson Correlation	1	.325**
	Sig. (2-tailed)		.000
	N	302	302
Household	Pearson Correlation	.325**	1
	Sig. (2-tailed)	.000	
	N	302	302

**Correlation is significant at the 0.00 level (2-tailed)

The regression analysis of Table 4, shows that electricity tariff increments explain 10.6% ($R^2 = 0.106$) of the variation in household expenses. Although this predictive power is moderate, it confirms that electricity tariffs are a meaningful contributor to household financial burden, alongside other economic factors such as income level, inflation, and alternative energy costs.

Table 4: Regression analysis for household respondents

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.325[a]	0.106	0.102	2.02566	1.408
a. Predictors: (Constant), Tariff					
b. Dependent Variable: Household					
Coefficients[a]					

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.392	0.947		12.033	0.000
	Tariff	0.136	0.062	0.325	2.183	0.030
a. Dependent Variable: Household						

For SMEs, the correlation analysis of Table 5 indicates a stronger positive relationship ($r = 0.421$, $p < 0.01$) between electricity tariff increases and business operating costs. The corresponding regression analysis of Table 6, show an R^2 value of 0.177, implying that electricity tariff increments account for 17.7% of the variation in SMEs' operating costs. This higher explanatory power, relative to households, reflects the greater dependence of SMEs on electricity for production, service delivery, and operational continuity.

Table 5: Effect of the increase in electricity tariff on SMEs in Nigeria

Correlations			
		Electricity Tariff	SMEs
Electricity Tariff	Pearson Correlation	1	0.421**
	Sig. (2-tailed)		0.001
	N	302	302
SMEs	Pearson Correlation	.421**	1
	Sig. (2-tailed)	0.001	
	N	302	302

**Correlation is significant at the 0.01 level (2-tailed).

Table 6: Regression analysis for SME respondents

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.421[a]	0.177	0.172	2.02968
a. Predictors: (Constant), Tariff				
b. Dependent Variable: SMEs				

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.995	0.949		10.536	0.000
	Tariff	0.175	0.062	.421	2.801	0.005
a. Dependent Variable: SMEs						

IV. RESULTS

The integrated findings demonstrate that increases in electricity tariffs exert significant financial pressure on both households and SMEs in Nigeria, with more severe implications for business operations. While modest improvements in supply stability and billing transparency were acknowledged, they have not translated into consumer acceptance of higher tariffs. The consistency of responses and the statistically significant relationships observed suggest that electricity tariff policy remains a critical economic and social issue. Without commensurate improvements in supply reliability, affordability, and transparency, continued tariff increases may exacerbate household welfare challenges and undermine the growth and sustainability of SMEs in Nigeria.

Figure 1 shows the comparison of the percentage responses obtained from each questionnaire item of the descriptive analysis of household consumers in Table 1.

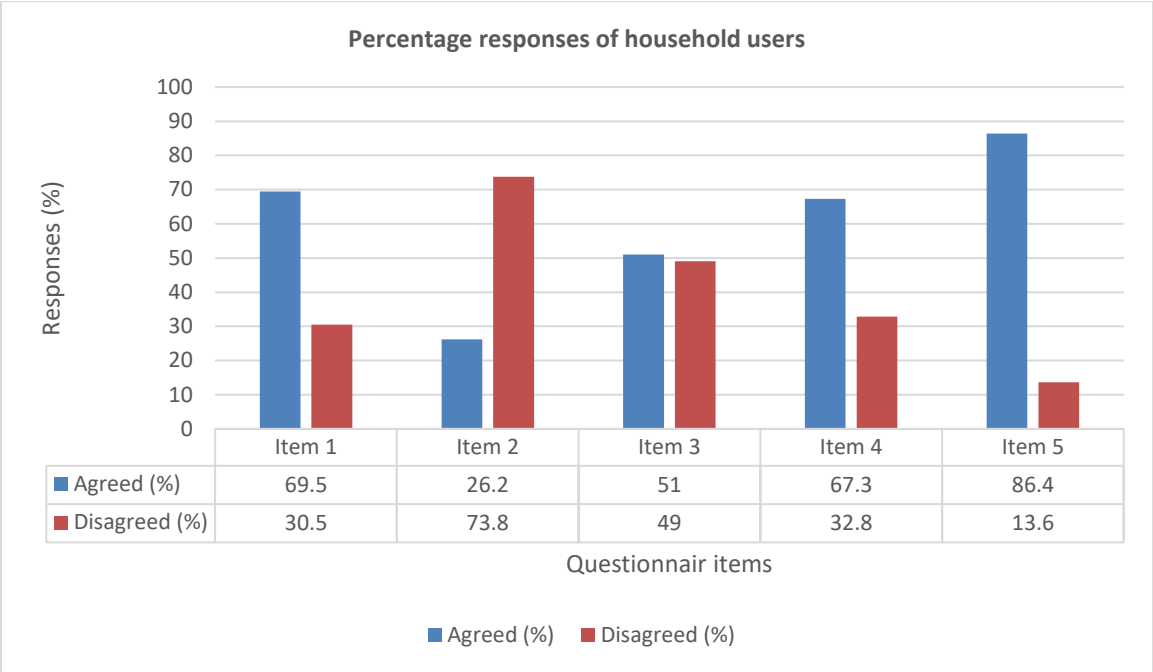

Figure 1: Comparison of household responses to the questionnaire items

These findings suggest that electricity costs constitute a substantial component of household expenditure and that tariff increases exert direct inflationary pressure on household budgets. The relatively low standard deviation values across all household-related items indicate consistency in respondents' perceptions, thereby strengthening the reliability of these findings.

Figure 2 presents a comparison of the percentage responses obtained from each questionnaire item of the descriptive analysis of SME consumers in Table 2.

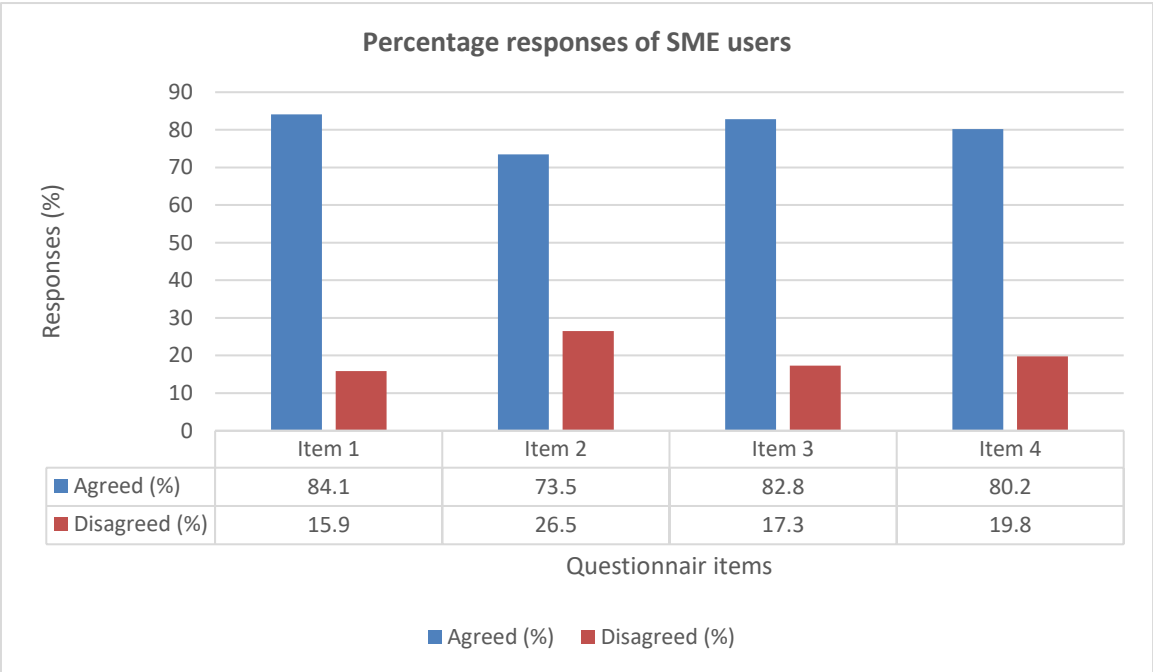

Figure 1: Comparison of SME responses to the questionnaire items

Given the central role of SMEs in employment generation and economic growth in Nigeria, these findings suggest that rising electricity tariffs may constrain business expansion, reduce competitiveness, and threaten the

sustainability of many enterprises. As with household responses, the low variability in responses indicates a shared and widespread perception of financial strain among SMEs.

V. DISCUSSION AND CONCLUSION

This study examined the effect of electricity tariff increases on households and small/medium-sized enterprises (SMEs) in Nigeria using inferential and regression analyses. The results provide clear empirical evidence that increases in electricity tariffs have a statistically significant and economically meaningful impact on both household expenses and SME operating costs. The Pearson Product Moment Correlation analysis revealed a positive and significant relationship between electricity tariff increases and household expenses ($r = 0.325$, $p < 0.01$), indicating that rising tariffs are associated with higher household expenditure levels. This relationship was further confirmed by the regression results, which showed that electricity tariff increases account for 10.6% of the variation in household expenses. Although this explanatory power is moderate, it demonstrates that electricity tariffs constitute an important driver of household financial burden in Nigeria. Similarly, the inferential results for SMEs revealed an even stronger relationship between electricity tariff increases and business operating costs. The correlation coefficient ($r = 0.421$, $p < 0.01$) indicates a substantial positive association, suggesting that higher electricity tariffs significantly raise the cost of doing business for SMEs. The regression analysis further established that electricity tariff increments explain 17.7% of the variation in SMEs' operating costs, highlighting the greater sensitivity of business operations to electricity pricing compared to household consumption. These findings underscore the critical role of electricity as a production input for SMEs and suggest that tariff increases can erode profitability, constrain growth, and threaten business sustainability.

The inferential and regression results confirm that electricity tariff increases exert measurable financial pressure on both households and SMEs, with more pronounced effects on business operations. This evidence suggests that electricity pricing remains a key economic policy variable with direct implications for household welfare and SME performance in Nigeria. Based on these findings, subsequent research may adopt longitudinal or time-series designs to examine the long-term effects of electricity tariff changes on household welfare and SME performance, as well as to capture the dynamic nature of electricity pricing reforms.

REFERENCES

[1] National Bureau of Statistics (NBS). (2024). Nigeria Residential Energy Demand-Side Survey Report 2024. https://nairametrics.com/2024/10/24/electricity-tariff-85-2-of-households-in-nigeria-are-still-on-estimated-billing-report/

[2] World Bank. (2020). Tracking SDG 7: The energy progress report 2020. https://trackingsdg7.esmap.org/

[3] Nkalo, U. K. and Agwu, E. O., (2019). "Review of the Impact of Electricity Supply on Economic Growth: A Nigerian Case Study", IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE), 14(1), pp 28-34. DOI: 10.9790/1676-1401012834

[4] Pelz, S., Chinichian, N., Neyrand, C. and Blechinger, P., (2023), Electricity Supply Quality and Use among Rural and Peri-Urban Households and Small Firms in Nigeria. *Sci Data* **10**, 273, pp 1-8.. https://doi.org/10.1038/s41597-023-02185-0

[5] Janghorban, P., Sesan, T., Salihu, M.-K., Ohunakin, O., and Chinichian, N. (2024). Willingness to Pay for an Electricity Connection: A Choice Experiment among Rural Households and Enterprises in Nigeria. Retrieved on January 23, 2026 from https://arxiv.org/pdf/2407.15757 Doi: 10.48550/arXiv.2407.15757

[6] Momoh, J. A. (2005). Overview and Recommendations of Unified Power Flow Controllers for Improved Nigerian Electric Power System. Nigerian Society of Engineers Technical Transactions.

[7] Akpan, P. L. (2013). Impact of the Nigerian Electricity Supply Industry on the Country's Economic Development. *Nigerian Journal of Energy*.

[8] Nigerian Energy Report. (2019). Disruptors: How Off-Grid Energy Companies are Closing Nigeria's Energy Gap. The Advance of Renewables in Nigeria. Business Day and Sterling Bank Nigeria.

[9] Akhator, P. E., Obanor, A. I., & Sadjere, E. G. (2019). Electricity Situation and Potential Development in Nigeria using Off-Grid Green Energy Solutions. *Journal of Applied Science and Environmental Management, 23*(3), 527-537. https://www.ajol.info/index.php/jasem

[10] Ike, C. V., (2021), Impact of Electricity on Industrial Output in Nigeria: A Systems Perspective, Walden Dissertations and Doctoral Studies Collection, Walden University ScholarWorks. Retrieved on January 23, 2026 from: https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=12718&context=dissertations

[11] Onah, B. N., Okafor, I., Oyigbo, D. N., & Nnate, K. N. (2021). Deployment of Energy Technologies for Sustainable Rural Agricultural Development in Nigeria. IOP Conference Series: Earth and Environmental Science, 730(1), 1-10. https://doi.org/10.1088/1755-1315/730/1/012039

[12] Herbert, E. B. (2022). America or India: Identifying a Suitable Off-Grid Rural Electrification Model for Nigeria. Journal of Sustainable Development, Law and Policy, 13(1), pp 36-63. https://doi.org/10.4314/jsdlp.v13i1.2

[13] International Hydropower Association (2022). A Brief History of Hydropower: From its Earliest Beginnings to the Modern Era. https://www.hydropower.org/iha/discover-history-of-hydropower

[14] Ghosh, A. and Kathuria, V. (2020). The Relationship between Electricity Prices and Economic Growth: A Case Study of India. *Energy Economics*, 85, 104590.

[15] IRENA – International Renewable Energy Agency, (2023), "Renewable Energy Roadmap: Nigeria", IRENA Publications. https://www.irena.org/publications

[16] Olanrele, I. (2024). Willingness to Pay for Reliable Electricity Supply in Nigeria: Evidence from Residential Consumers. African Journal of Economic Review (AJER), 13(1), pp 26-40.

[17] Yelwa, M. and Awe, E. O. (2018). Impact of Electricity Power Outage on the Productivity of SMEs in FCT, Nigeria. Bingham Journal of Environment and Applied Studies (BJEAS), 1(2), pp 1-12.

[18] Akomolafe, K. J. A. (2024). Power Outages and the Performance of Small and Medium Scale Enterprises (SMEs) in Ekiti State, Nigeria. *African Journal of Stability and Development*. (AJSD), 16(2), pp 418-437. Doi: 10.53982/ajsd.2024.1602.11-1
[19] Udah, E. B. (2010). Industrial Development, Electricity Crisis and Economic performance in Nigeria. *European Journal of Economics, Finance and Administrative Sciences*, 105-121. Retrieved from: http://www.eurojournals.com
[20] Webster, L. M. (1991). Small Enterprises under Adjustment in Ghana. World Bank Technical Paper, 138, 62-83.
[21] REAN - Renewable Energy Association of Nigeria, (2021). Exploring Sources of Funding for Off-Grid Rural Electrification. https://www.rean.org.ng
[22] World Bank. (2023). Nigeria's Economic Update. Retrieved from https://www.worldbank.org
[23] Adenikinju, A. (2020). Electricity Infrastructure Failures in Nigeria: A Survey-based Analysis of the Costs and Adjustment Responses. *Energy Policy, 139*, 111330.
[24] Eze, C., & Okonkwo, F. (2024). Electricity Tariff Hikes and Household Welfare in the Niger Delta: A Microeconomic Perspective. Nigerian Journal of Energy Economics, 15(1), 23–38.
[25] Onyema, E., Udoh, F., & Ibe, U. (2021). Electricity Tariffs and Affordability in Urban Nigeria: An Empirical Study on Ikeja DisCo. Energy and Sustainable Development, 33(1), 76–85.
[26] Oghenekaro, T. and Nwachukwu, P. (2024). Analyzing the Effects of Electricity Pricing on SMEs in Southern Nigeria. Journal of African Business Studies, 11(2), 45–61.
[27] Cochran, W. G. (1977). Sampling Techniques (3rd ed.). John Willey & Sons.
[28] Ndu, E. C. (2018). Service Systems Quality and Sustainable Tourism Development in Nigeria. PhD Thesis, University of Port Harcourt.
[29] Pack, H., (1994), "Endogenous Growth Theory: Intellectual Appeal and Empirical Shortcomings", Journal of Economic Perspectives (JEP), 8(1), pp 55-72.
[30] Onyimadu, C. O., (2015), "An Overview of Endogenous Growth Models: Theory and Critique", International Journal of Physical and Social Studies (IJPSS), 5(3), pp 498-514. DOI:10.2139/ssrn.2685545